APPENDIX B

MODEL STATEMENT OF WORK FOR CONDUCTING AN RI/FS

B-l. Purpose.

a. The purpose of this remedial investigation/feasibility study (RI/FS) is to investigate the nature and extent of contamination at the (Name of Site) and to develop and evaluate remedial alternatives, as appropriate. The contractor will furnish all necessary personnel, materials, and services needed for, or incidental to, performing the RI/FS, except as otherwise specified herein. The contractor will conduct the RI/FS in accordance with the Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (U.S. EPA, October 1988).

b. This statement of work (SOW) has been developed for the (Name of Site) that operated as a [Briefly Describe Site].

B-2. Scope.

a. The specific RI/FS activities to be conducted at the (Name of Site) are segregated into 11 separate tasks.

(1) Task 1 - Project Planning
(2) Task 2 - Community Relations
(3) Task 3 - Field Investigations
(4) Task 4 - Sample Analysis/Validation
(5) Task 5 - Data Evaluation
(6) Task 6 - Risk Assessment
(7) Task 7 - Treatability Studies
(8) Task 8 - RI Report(s)
(9) Task 9 - Remedial Alternatives Development and Screening
(10) Task 10 - Detailed Analysis of Alternatives
(11) Task 11 - FS Report(s)

b. The contractor will specify a schedule of activities and deliverables, a budget estimate, and staffing requirements for each of the tasks which are described below.

B-3. Task 1 Project Planning.

a. Upon receipt of an interim authorization memorandum (used to authorize work plan preparation) and this SOW from [Engineer District] outlining the general scope of the project, the contractor will begin planning the specific RI/FS activities that will need to be conducted. As part of this planning effort, the contractor will compile existing information (e.g., topographic maps, aerial photographs, data collected as part of the NPL listing process, and data collected as part of the drum removal of 1982) and conduct a site visit to become familiar with site topography, access routes, and the proximity of potential receptors to site contaminants. Based on this information (and any other available data), the contractor will prepare a site background summary that should include the following:

(1) Local Regional Summary - A summary of the location of the site, pertinent area boundary features and general site physiography, hydrology, geology, and the location(s) of any nearby drinking water supply wells.

(2) Nature and Extent of Problem - A summary of the actual and potential onsite and offsite health and environmental effects posed by any remaining contamination at the site. Emphasis should be on providing a conceptual understanding of the sources of contamination, potential release mechanisms, potential routes of migration, and potential human and environmental receptors.

(3) History of Regulatory and Response Actions - A summary of any previous response actions conducted by local, state, Federal, or private parties. This summary should address any enforcement activities undertaken to identify responsible parties, compel private cleanup, and recover costs. Site reference documents and their locations should be identified.

(4) Preliminary Site Boundary - A preliminary site boundary to define the initial area(s) of the remedial investigation. This preliminary boundary may also be used to define an area of access control and site security.

b. The contractor will meet with [Name of Engineer District] personnel to discuss the following:

(1) The proposed scope of the project and the specific investigative and analytical activities that will be required.

(2) Whether there is a need to conduct limited sampling to adequately scope the project and develop project plans.

(3) Preliminary remedial action objectives and general response actions.

(4) Potential remedial technologies and the need for or usefulness of treatability studies.

(5) Potential ARARs associated with the location and contaminants of the site and the potential response actions being contemplated.

(6) Whether a temporary site office should be set up to support site work.

c. Once the scope has been agreed upon with [Name of Engineer District], the contractor will: (1) develop the specific project plans to meet the objectives of the RI/FS and (2) initiate subcontractor procurement and coordination with analytical laboratories. [At some sites it may be necessary to submit an interim work plan initially until more is learned about the site. A subsequent, more thorough project planning effort can then be used to develop final work plans.] The project plans will include: a work plan which provides a project description and outlines the overall technical approach, complete with corresponding personnel requirements, activity schedules, deliverable due dates, and budget estimates for each of the

specified tasks; a sampling and analysis plan [composed of the field sampling plan (FSP) and the quality assurance project plan (QAPP)]; a health and safety plan (HSP); and a community relations plan (CRP).

d. The contractor will prepare a sampling and analysis plan (SAP) which will consist of the following:

(1) Field Sampling Plan. The FSP should specify and outline all necessary activities to obtain additional site data. It should contain an evaluation explaining what additional data are required to adequately characterize the site, conduct a baseline risk assessment, and support the evaluation of remedial technologies in the FS. The FSP should clearly state sampling objectives; necessary equipment; sample types, locations, and frequency; analyses of interest; and a schedule stating when events will take place and when deliverables will be submitted.

(2) Quality Assurance Project Plan. The QAPP should address all types of investigations conducted and should include the following discussions:

(a) A project description (should be duplicated from the work plan).

(b) A project organization chart illustrating the lines of responsibility of the personnel involved in the sampling phase of the project.

(c) Quality assurance objectives for data such as the required precision and accuracy, completeness of data, representatives of data, comparability of data, and the intended use of collected data.

(d) Sample custody procedures during sample collection, in the laboratory, and as part of the final evidence files.

(e) The type and frequency of calibration procedures for field and laboratory instruments, internal quality control checks, and quality assurance performance audits and system audits.

(f) Preventative maintenance procedures and schedule and corrective action procedures for field and laboratory instruments.

(g) Specific procedures to assess data precision, representativeness, comparability, accuracy, and completeness of specific measurement parameters.

(h) Data documentation and tracking procedures.

(3) Health and Safety Plan - The contractor will develop an HSP on the basis of site conditions to protect personnel involved in site activities and the surrounding community. The plan should address all applicable regulatory requirements contained in 20 CFR 1910.120(i)(2) - Occupational Health and Safety Administration, Hazardous Waste Operations and Emergency Response, Interim Rule, December 19, 1986; U.S. EPA Order 1440.2 - Health and Safety Requirements for Employees Engaged in Field Activities; U.S. EPA Order 1440.3 - Respiratory Protection; U.S. EPA Occupational Health and Safety Manual; and U.S. EPA Interim Standard Operating Procedures (September 1982).

The plan should provide a site background discussion and describe personnel responsibilities, protective equipment, health and safety procedures and protocols, decontamination procedures, personnel training, and type and extent of medical surveillance. The plan should identify problems or hazards that may be encountered and how these are to be addressed. Procedures for protecting third parties, such as visitors or the surrounding community, should also be provided. Standard operating procedures for ensuring worker safety should be referenced and not duplicated in the HSP.

(4) Community Relations Plan - The contractor will prepare a community relations plan on how citizens want to be involved in the process based on interviews with community representatives and leaders. The CRP will describe the types of information to be provided to the public and outline the opportunities for community comment and input during the RI/FS. Deliverables, schedule, staffing, and budget requirements should be included in the plan.

e. The work plan and corresponding activity plans will be submitted to [Name of Engineer District] as specified in the contract or as discussed in the initial meeting(s). The contractor will provide a quality review of all project planning deliverables.

B-4. Task 2 Community Relations.

a. The contractor will provide the personnel, services, materials, and equipment to assist [Name of Engineer District] in undertaking a community relations program. This program will be integrated closely with all remedial response activities to ensure community understanding of actions being taken and to obtain community input on RI/FS progress. Community relations support provided by the contractor will include, but may not be limited to, the following:

(1) Revisions or additions to community relations plans, including definition of community relations program needs for each remedial activity.

(2) Establishment of a community information repository(ies), one of which will house a copy of the administrative record.

(3) Preparation and dissemination of news releases, fact sheets, slide shows, exhibits, and other audio-visual materials designed to apprise the community of current or proposed activities.

(4) Arrangements of briefings, press conferences, workshops, and public and other informal meetings.

(5) Analysis of community attitudes toward the proposed actions.

(6) Assessment of the successes and failures of the community relations program to date.

(7) Preparation of reports and participation in public meetings, project review meetings, and other meetings as necessary for the normal progress of the work.

(8) Solicitation, selection, and approval of subcontractors, if needed.

b. Deliverables and the schedule for submittal will be identified in the community relations plan discussed under Task 1.

B-5. Task 3 Field Investigations.

a. The contractor will conduct those investigations necessary to characterize the site and to evaluate the actual or potential risk to human health and the environment posed by the site. Investigation activities will focus on problem definition and result in data of adequate technical content to evaluate potential risks and to support the development and evaluation of remedial alternatives during the FS. The areal extent of investigation will be finalized during the remedial investigation.

b. Site investigation activities will follow the plans developed in Task 1. Strict chain-of-custody procedures will be followed and all sample locations will be identified on a site map. The contractor will provide management and QC review of all activities conducted under this task. Information from this task will be summarized and included in the RI/FS report appendixes. Activities anticipated for this site are as follows:

(1) Surveying and Mapping of the Site - Develop a map of the site that includes topographic information and physical features on and near the site. If no detailed topographic map for the site and surrounding area exists, a survey of the site will be conducted. Aerial photographs should be used, when available, along with information gathered during the preliminary site visit to identify physical features of the area. May be conducted under Task 1 as part of the site visit or limited investigation.

(2) Waste Characterization - Determine the location, type, and quantities as well as the physical or chemical characteristics of any waste remaining at the site. If hazardous substances are held in containment vessels, the integrity of the containment structure and the characteristics of the contents will be determined.

(3) Hydrogeologic Investigation - Determine the presence and potential extent of ground-water contamination. Efforts should begin with a survey of previous hydrogeologic studies and other existing data. The survey should address the soil*s retention capacity/mechanisms, discharge/recharge areas, regional flow directions and quality, and the likely effects of any alternatives that are developed involving the pumping and disruption of ground-water flow. Results from the sampling program should estimate the horizontal and vertical distribution of contaminants, and the contaminants* mobility and predict the long-term disposition of contaminants.

(4) Soils and Sediments Investigation - Determine the vertical and horizontal extent of contamination of surface and subsurface soils and sediments and identify any uncertainties with this analysis. Information on local background levels, degree of hazard, location of samples, techniques used, and methods of analysis should be included. If initial efforts indicate

that buried waste may be present, the probable locations and quantities of these subsurface wastes should be identified through the use of appropriate geophysical methods.

(5) Surface Water Investigation - Estimate the extent and fate of any contamination in the nearby surface waters. This effort should include an evaluation of possible future discharges and the degree of contaminant dilution expected.

(6) Air investigation - Investigate the extent of atmospheric contamination from those contaminants found to be present at the site. This effort should assess the potential of the contaminants to enter the atmosphere, local wind patterns, and the anticipated fate of airborne contaminants.

B-6. Task 4 Sample Analysis/Validation. The contractor will develop a data management system including field logs, sample management and tracking procedures, and document control and inventory procedures for both laboratory data and field measurements to ensure that the data collected during the investigation are of adequate quality and quantity to support the risk assessment and the FS. Collected data should be validated at the appropriate field or laboratory QC level to determine whether it is appropriate for its intended use. Task management and quality controls will be provided by the contractor. The contractor will incorporate information from this task into the RI/FS report appendixes.

B-7. Task 5 Data Evaluation. The contractor will analyze all site investigation data and present the results of the analyses in an organized and logical manner so that the relationships between site investigation results for each medium are apparent. The contractor will prepare a summary that describes (a) the quantities and concentrations of specific chemicals at the site and the ambient levels surrounding the site; (b) the number, locations, and types of nearby populations and activities; and (c) the potential transport mechanism and the expected fate of the contaminant in the environment.

B-8. Task 6 Risk Assessment.

a. The contractor shall conduct a baseline risk assessment to assess the potential human health and environmental risks posed by the site in the absence of any remedial action. This effort will involve four components: contaminant identification, exposure assessment, toxicity assessment, and risk characterization.

(1) Contaminant Identification - The contractor will review available information on the hazardous substances present at the site and identify the major contaminants of concern. Contaminants of concern should be selected based on their intrinsic toxicological properties because they are present in large quantities, and/or because they are currently in, or potentially may migrate into, critical exposure pathways (e.g., drinking water).

(2) Exposure Assessment - The contractor will identify actual or potential exposure pathways, characterize potentially exposed populations, and evaluate the actual or potential extent of exposure.

(3) Toxicity Assessment - The contractor will provide a toxicity assessment of those chemicals found to be of concern during site investigation activities. This will involve an assessment of the types of adverse health or environmental effects associated with chemical exposures, the relationships between magnitude of exposures and adverse effects, and the related uncertainties for contaminant toxicity (e.g., weight of evidence for a chemical*s carcinogenicity).

(4) Risk Characterization - The contractor will integrate information developed during the exposure and toxicity assessments to characterize the current or potential risk to human health and/or the environment posed by the site. This characterization should identify the potential for adverse health or environmental effects for the chemicals of concern and identify any uncertainties associated with contaminant(s), toxicity(ies), and/or exposure assumptions.

b. The risk assessment will be submitted to [Name of Engineer District] as part of the RI report.

B-9. Task 7 Treatability Studies.

a. The contractor will conduct bench and/or pilot studies as necessary to determine the suitability of remedial technologies to site conditions and problems. Technologies that may be suitable to the site should be identified as early as possible to determine whether there is a need to conduct treatability studies to better estimate costs and performance capabilities. Should treatability studies be determined to be necessary, a testing plan identifying the types and goals of the studies, the level of effort needed, a schedule for completion, and the data management guidelines should be submitted to [Name of Engineer District] for review and approval. Upon [Name of Engineer District] approval, a test facility and any necessary equipment, vendors, and analytical services will be procured by the contractor.

b. Upon completion of the testing, the contractor will evaluate the results to assess the technologies with respect to the goals identified in the test plan. A report summarizing the testing program and its results should be prepared by the contractor and presented in the final RI/FS report. The contractor will implement all management and QC review activities for this task.

B-10. Task 8 RI Report(s).

a. Monthly reports will be prepared by the contractor to describe the technical and financial progress at the (Name of Site). Each month the following items will be reported:

(1) Status of work and the progress to date.

(2) Percentage of the work completed and the status of the schedule.

(3) Difficulties encountered and corrective actions to be taken.

(4) The activity(ies) in progress.

(5) Activities planned for the next reporting period.

(6) Any changes in key project personnel.

(7) Actual expenditures (including fee) and direct labor hours for the reporting period and for the cumulative term of the project.

(8) Projection of expenditures needed to complete the project and an explanation of significant departures from the original budget estimate.

b. Monthly reports will be submitted to [Name of Engineer District] as specified in the contract. In addition, the activities conducted and the conclusions drawn during the remedial investigation (Tasks 3 through 7) will be documented in an RI report (supporting data and information should be included in the appendixes of the report). The contractor will prepare and submit a draft RI report to [Name of Engineer District] for review. Once comments on the draft RI report are received, the contractor will prepare a final RI report reflecting these comments.

B-ll. Task 9 Remedial Alternatives Development and Screening.

a. The contractor will develop a range of distinct, hazardous waste management alternatives that will remediate or control any contaminated media (soil, surface water, ground water, sediments) remaining at the site, as deemed necessary in the RI, to provide adequate protection of human health and the environment. The potential alternatives should encompass, as appropriate, a range of alternatives in which treatment is used to reduce the toxicity, mobility, or volume of wastes but vary in the degree to which long-term management of residuals or untreated waste is required, one or more alternatives involving containment with little or no treatment; and a no-action alternative. Alternatives that involve minimal efforts to reduce potential exposures (e.g., site fencing, deed restrictions) should be presented as “limited action” alternatives.

b. The following steps will be conducted to determine the appropriate range of alternatives for this site:

(1) Establish Remedial Action Objectives and General Response Actions - Based on existing information, site-specific remedial action objectives to protect human health and the environment should be developed. The objectives should specify the contaminants(s) and media of concern, the exposure route(s) and receptor(s), and an acceptable contaminant level or range of levels for each exposure route (i.e., preliminary remediation goals). Preliminary

remedial action objectives are developed as part of the project planning phase.

(2) Preliminary remediation goals should be established based on readily available information (e.g., Rfds) or chemical-specific ARARs (e.g., MCLs). The contractor should meet with [Name of Engineer District] to discuss the remedial action objectives for the site. As more information is collected during the RI, the contractor, in consultation with [Name of Engineer District], will refine remedial action objectives as appropriate.

(3) General response actions will be developed for each medium of interest defining contaminant, treatment, excavation, pumping, or other actions, singly or in combination to satisfy remedial action objectives. Volumes or areas of media to which general response actions may apply shall be identified, taking into account requirements for protectiveness as identified in the remedial action objectives and the chemical and physical characteristics of the site.

(4) Identify and Screen Technologies - Based on the developed general response actions, hazardous waste treatment technologies should be identified and screened to ensure that only those technologies applicable to the contaminants present, their physical matrix, and other site characteristics will be considered. This screening will be based primarily on a technology*s ability to effectively address the contaminants at the site, but will also take into account a technology*s implementability and cost. The contractor will select representative process options, as appropriate, to carry forward into alternative development. The contractor will identify the need for treatability testing (as described under Task 7) for those technologies that are probable candidates for consideration during the detailed analysis.

(5) Configure and Screen Alternatives - The potential technologies and process options will be combined into media-specific or sitewide alternatives. The developed alternatives should be defined with respect to size and configuration of the representative process options; fine for remediation; rates of flow or treatment; spatial requirements; distances for disposal; and required permits, imposed limitations, and other factors necessary to evaluate the alternatives. If many distinct, viable options are available and developed, a screening of alternatives will be conducted to limit the number of alternatives that undergo the detailed analysis and to provide consideration of the most promising process options. The alternatives should be screened on a general basis with respect to their effectiveness, implementability, and cost. The contractor will meet with [Name of Engineer District] to discuss which alternatives will be evaluated in the detailed analysis and to facilitate the identification of action-specific ARARs.

B-12. Task 10 Detailed Analysis of Alternatives.

a. The contractor will conduct a detailed analysis of alternatives which will consist of an individual analysis of each alternative against a set of evaluation criteria and a comparative analysis of all options against the evaluation criteria with respect to one another.

b. The evaluation criteria are as follows:

(1) Overall Protection of Human Health and the Environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering or institutional controls.

(2) Compliance with ARARs addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and state environmental statutes and/or provide grounds for invoking a waiver.

(3) Long-Term Effectiveness and Permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

(4) Reduction of Toxicity, Mobility, or Volume Through Treatment is the anticipated performance of the treatment technologies a remedy may employ.

(5) Short-Term Effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

(6) Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

(7) Cost includes estimated capital and operation and maintenance costs, and net present worth costs.

(8) State Acceptance (Support Agency) addresses the technical or administrative issues and concerns the support agency may have regarding each alternative.

(9) Community Acceptance addresses the issues and concerns the public may have to each of the alternatives.

c. The individual analysis should include:

(1) A technical description of each alternative that outlines the waste management strategy involved and identifies the key ARARs associated with each alternative; and

(2) A discussion that profiles the performance of that alternative with respect to each of the evaluation criteria. A table summarizing the results of this analysis should be prepared. Once the individual analysis is complete, the alternatives will be compared and contrasted to one another with respect to each of the evaluation criteria.

B-13. Task 11 FS Report(s).

a. Monthly contractor reporting requirements for the FS are the same as those specified for the RI under Task 8.

b. The contractor will present the results of Tasks 9 and 10 in a FS report. Support data, information, and calculations will be included in appendixes to the report. The contractor will prepare and submit a draft FS report to [Name of Engineer District] for review. Once comments on the draft FS have been received, the contractor will prepare a final FS report reflecting the comments. Copies of the final report will be made and distributed to those individuals identified by [Name of Engineer District].